

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– III (New) EXAMINATION – WINTER 2019****Subject Code: 3133906****Date: 12/5/2019****Subject Name: Material Science****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		Marks
Q.1	(a) Define miller indices.	03
	(b) Explain reciprocal lattice vector in short.	04
	(c) Explain bragg's law with ray diagram and derived its. equations	07
Q.2	(a) Define crystal and crystal plane.	03
	(b) write feature of miller indices	04
	(c) Explain in brief Fundamental types of lattice.	07
	OR	
	(c) Define indexing system for crystal plan.	07
Q.3	(a) Define primitive lattice.	03
	(b) Explain in short defect in solid	04
	(c) Draw ray diagram and explain Diffraction condition.	07
	OR	
Q.3	(a) Draw 111,101,110 cubic structure lattice pattern.	03
	(b) Write Atoms per unit cell, Co-ordinations number and atomic packing fraction of sc, bcc, hcp and fcc crystal structure	04
	(c) Explain lattice translation vector in brief.	07
Q.4	(a) Explain magnetic properties of material.	03
	(b) Define Heat capacity of the electron gas in short.	04
	(c) Explain in brief Electron Motion in magnetic field.	07
	OR	
Q.4	(a) Define the term cohesive energy and hydrogen bond.	03
	(b) Write short notes on Scattered wave amplitude.	04
	(c) Derive the Debye equation systematically.	07
Q.5	(a) Define covalent crystal.	03
	(b) Explain broadly Energy Levels in One dimension.	04
	(c) States and explain ohm's law and define the parameter Electrical conductivity, electrical resistivity of metal	07
	OR	
Q.5	(a) Define ionic crystal.	03
	(b) Define the Effect of temperature on Fermi Dirac distribution.	04
	(c) Explain Free electron in three dimensions.	07
